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A Clustering Technique for Digital Communication Channel Equalization Using Wavelet Neural Networks

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Abstract

In this paper, we propose a wavelet neural network (WNN) for nonlinear time-invariant and time-varying channel equalizers. The WNN model is a four-layer structure which is comprised of an input layer, a wavelet layer, a product layer, and an output layer. A hybrid learning algorithm consists of structure and parameter learning algorithms. The structure learning is based on a self-clustering algorithm (SCA). It not only considers the original dilation and translation but also consider every translation and dilation's variation of dimension in the input data. The parameter learning is based on a simultaneous perturbation method for adjusting the parameters. Computer simulation results show that the bit error rate of the WNN equalizer is close to that of the optimal equalizer.

Key words：Cluster;Wavelet neural network;Digital communication;Equalizer